Innovations
Tomorrow’s medicine today
Mayo Clinic’s mission

Mayo will provide the best care to every patient every day through integrated clinical practice, education and research.

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Much of what we hear about medicine today revolves around technology. Dramatic research advances, such as the mapping of the human genome and discovery of therapeutic agents designed to fight diseases once thought untreatable, capture our attention and our imagination.

But an essential element of medicine that can’t be forgotten in the rush of medical advances is personal care for the patient. Finding the right balance between technological innovation and personal, compassionate care is essential to providing the best in medicine. Both are necessary for the highest-quality care.

Mayo Clinic is unique in its ability to provide the best in medical diagnosis and treatment, and to lead in the discovery and implementation of tomorrow’s medical innovations. Providing the best in personal care is the result of an unswerving focus on the needs of our patients. Leading in innovation is the result of an unfailing commitment to medical research and education as critical components of our mission.

In this publication, you’ll find stories of patients who have benefited from Mayo Clinic’s innovative practices and approach to medical care. In each case, you’ll see examples of tomorrow’s medicine making a difference in the lives of our patients today. These same stories bring hope for additional advances as people throughout Mayo strive to provide the best care to every patient, every day.

Michael B. Wood, M.D.  
President,  
Mayo Foundation
Living with cancer is difficult. When the cancer settles in your bones, just going about your daily life can be nearly impossible.

Heather Henrichs felt that pain. She wasn’t about to give in, but she soon learned it would take more than determination to work through this.

“I didn’t know how debilitating the pain could be,” recalls the 29-year-old from Billings, Mont. Heather was diagnosed seven years ago with a rare type of endocrine cancer known as paraganglioma. Striking just one in 100,000 people, this cancer typically invades the body’s bones, causing excruciating pain.

When tumors attacked the bones in Heather’s shoulder, she says, “The pain took my breath away.”

Then came a new pain — this time in her back. “I was hoping it was a pulled muscle, so I tried pushing through the pain,” she says. “But it was a different kind of pain. When I coughed or sneezed, it weakened my knees, and I’d have to stand against the wall.”

Cancer that spreads to the bones, such as the spine, pelvis, ribs or shoulder, is called metastatic bone cancer. At this advanced stage, the cancer is likely incurable and often causes severe pain.

When chemotherapy, radiation and drugs were unsuccessful in easing Heather’s pounding pain, her doctor consulted with Mayo Clinic’s J. William Charboneau, M.D., and Matthew Callstrom, M.D., Ph.D., about the possibility of a new pain-management technique known as radio-frequency ablation.

After four treatments at Mayo Clinic in Rochester for pain in one of her shoulder blades, two ribs and liver, Heather is pain-free today.

Thanks to this groundbreaking procedure pioneered at Mayo, Heather has reclaimed her life. First diagnosed with cancer when she was pregnant, she now is able to enjoy time again with family, including her active 7-year-old son.

Groundbreaking study punctures pain

Heather’s treatment, radio-frequency ablation, had been used for years to treat other ailments — ranging from heart arrhythmias to liver and kidney cancer. A Mayo study showed that radio-frequency ablation also can be a safe, effective and long-lasting method of alleviating pain from bone cancer.

Mayo Clinic Cancer Center researchers, looking for an answer to cancer pain, conducted a 10-month clinical trial following Heather and 11 other adult patients with painful lesions in the bone who hadn’t responded well to standard pain treatment.

Before the new treatment, the pain these patients experienced averaged 6.5 on a scale of one to 10, with 10 being the worst pain level. Four weeks after treatment, patients reported their pain had decreased to an average of 1.8. Two years after receiving the treatment, most of the patients remain relatively pain-free.

“The main goal of this study was to return a quality of life to patients, so they weren’t dominated by pain,” says Dr. Callstrom, a Mayo Clinic radiologist and co-investigator of the study.

“In our study, most patients had failed all traditional therapy,” he says. “Surgery wasn’t an option, because these patients usually had disease elsewhere. So they were left with oral medications. You can give people large amounts of medications that may ease their pain, but the side effects may become an overriding factor, and their quality of life suffers.”

Initial results of the Mayo study were so promising that 31 additional cancer patients were added to the study, making the Mayo investigation the largest study ever conducted on the use of radio-frequency ablation for pain relief.

“Results far exceeded what we expected,” says Dr. Charboneau, a Mayo
radiologist and principal investigator of the study. “It’s quite amazing to see these patients going from unbearable pain to often becoming pain-free and being able to resume a near-normal life after one treatment. We thought we would see some improvement in the relief of pain. But the improvement was dramatic.”

Preliminary results of the expanded study show 41 of 43 patients experienced a drop of two or more points in the severity of pain after one radiofrequency ablation treatment. As of December 2002, the Mayo-led study had grown to include 62 patients being treated at medical centers across the United States and Europe. Clinical trials such as the radio-frequency ablation study play a critical role in developing new procedures and bringing innovative treatments to patients.

As a result of this study, radiofrequency ablation has received clearance from the Food and Drug Administration for treating painful metastatic lesions involving the bones.

“Our study provides further evidence that even the most challenging cancer pain can often be effectively and safely controlled,” says Dr. Charboneau. “Most importantly, patients whose cancer has spread to the bone can now enjoy a good quality of life.”

Procedure is minimally invasive with few side effects

The radio-frequency ablation treatment is a 30-minute procedure that is relatively noninvasive. Patients receive light general anesthesia, and a needle-like electrode with a heat-conducting tip is inserted into a small incision and guided to the cancerous tissue by computed tomography or ultrasound. Several smaller electrodes then spread out into the tumor and transmit intense heat, killing the cancer cells while deadening the nerves that cause the pain. Patients leave the hospital with just a small adhesive bandage covering the incision and experience few side effects.

Radio-frequency ablation shows great promise for patients suffering unbearable cancer pain. Approximately 50 percent of cancer patients will develop metastatic disease. In about half of these patients, the cancer spreads to the bone, making them potential candidates for the treatment.

It’s an important option for patients with hard-to-treat cancer, according to Dr. Callstrom. “Approximately 25 percent of these patients fail to respond well to radiation therapy, leaving them with bone cancer pain without viable pain-management options — until now.”

“We’re in a fortunate situation with technology that has shown a significant and dramatic improvement in patient care with just a small number of patients,” says Dr. Charboneau. “This is very new technology, which we only began using three years ago. And the results far surpass what we expected. “We’re in the early years of a new frontier in therapy, and we’re highly optimistic that this is only going to get better as the technology improves, and as we learn how to use it more effectively,” he says. “We are grateful that these patients now have an option for alleviating their severe pain.”

Finding fresh hope

While Heather knows radio-frequency ablation won’t cure her cancer, she says, “Each time I have a treatment, I know that one more piece of the cancer is dead, and won’t cause me pain anymore.”

Dr. Charboneau sees the power of that knowledge. “Knowing that something is being destroyed is encouraging for patients — to know they’re winning the war on their cancer in a small way,” he says.

“It helps mentally and emotionally to know that I can keep fighting,” says Heather. “Doctors keep coming up with these new treatments, which gives me hope. It keeps the fight fresh.”
“Seven years is a long time to be actively battling cancer,” she says. “My doctors have allowed me to have an active role in my treatment and to decide what I want to do. They give me many options, and I get to choose which ones might be the best for me. Even if your cancer has been classified as incurable, like mine, there are still things that can be done to help you be more comfortable.”

“We’re so pleased to be able to offer this treatment to Heather,” says Dr. Charboneau. “It is likely that if she didn’t have this treatment two years ago, she would have required a high level of narcotics, which would have adversely affected her quality of life.”

Meanwhile, Heather is reaping the benefits of the radio-frequency ablation treatments. She has resumed an active life, teaching dance classes at her mother’s studio in Billings and spending quality time with her grateful family.

Her advice to others: “In situations like this, I think we all have amazing strength, if we decide to use it or can find it within ourselves.” Heather has clearly made that decision.

“It is likely that if Heather didn’t have this treatment two years ago, she would have required a high level of narcotics which would have adversely affected her quality of life.”

—J. William Charboneau, M.D.
A gift with heart
Procedures such as a rare triple transplant keep the field moving forward

Valentine’s Day 2002 was like no other for Hazel Roby. Last year, she received a very special heart. It wasn’t chocolate nestled in a gold box. This heart arrived two days earlier — a gift of life, packaged neatly with two donor lungs.

No gift could have meant as much to this great-grandmother from Derby, Kas. Without a heart and double-lung transplant, performed Feb. 12, 2002, Hazel may never have celebrated another Feb. 14.

Hazel’s local cardiologist diagnosed her condition, severe primary pulmonary hypertension, in March 2001. By the time she came to Mayo Clinic her health was deteriorating so rapidly that even aggressive experimental drug therapy couldn’t prevent her heart from failing.

Her tenuous condition suggested a heart, double-lung transplant, a surgery so complex it’s usually reserved for patients under 55. Yet the transplant surgeons at Mayo Clinic in Jacksonville were willing to look beyond Hazel’s age, which otherwise might have disqualified her for this rare triple transplant, to her overall health and positive attitude, which made her a good candidate. After carefully weighing her condition, they offered a cautious expectation of success.

“We all felt that she behaved mentally and physically like somebody younger than her chronologic age of 61. So the decision wasn’t that difficult,” says Cesar Keller, M.D., medical director of the Heart-Lung and Lung Transplant Program at Mayo Clinic in Jacksonville. “In the end, she proved us right.”

As for Hazel? With national statistics suggesting only a 50 percent chance of success, she wasn’t sure at first that a heart and double-lung transplant was worth the risk. But the further her disease progressed, the more she realized this was her last hope.

“I accepted the fact that this was what it would take if I wanted to live,” says Hazel. “And I just felt if it were possible, they could do it.”

Advancing the practice
Hazel couldn’t have been in better hands. Even though the heart-lung program at Mayo Clinic in Jacksonville was only two years old, team members brought extensive experience to the table. And while her procedure would be performed in Jacksonville, she was benefiting from an institutionwide philosophy that the best outcomes emerge when patient care is backed by multidisciplinary expertise and scientific pursuit.

Indeed, since surgeons performed the first kidney procedures at Mayo Clinic in 1963, thousands of organ recipients, like Hazel, have benefited from the collective, innovative skills of Mayo’s transplant leaders.

Today, transplant teams in Rochester, Jacksonville and Scottsdale are applying cutting-edge techniques in the care of patients who desperately need major organs. Their collaborations are producing clinical outcomes consistently above national norms. But most important, they’re providing life-saving alternatives for patients who have few remaining choices.

Mayo Clinic’s transplant centers have more than 5,000 procedures to their collective credit. A number of transplant procedures have been pioneered in Rochester, where the program’s evolution has mirrored the science itself. This progress included the addition of bone-marrow transplantation in 1982, followed by liver in 1985, pancreases in 1987, heart in 1988, and lung in 1990.

In Rochester, Mayo’s transplant programs are integrated under one umbrella, the William J. von Liebig Transplant Center, an organizational model that brings together — both in concept and proximity — a range of transplant specialists and services to deliver the highest-quality coordinated care.

“What distinguishes Mayo’s program is that we’ve put the patient at the center of everything,” says Christopher McGregor, M.D., director of the transplant center in Rochester. “We’ve integrated core services in one place so that patients can always see the appropriate specialist in one location.”
These efforts have resulted in major-organ survival rates topping 90 percent after one year (and often after three years). In addition, by pioneering procedures and educating others to follow their leads, Mayo Clinic’s transplant teams are moving the field forward. Transplant surgeons in Rochester were the first in the United States to perform a quadruple transplant — heart, double lung and liver. They also were among the first to employ a rare “domino” procedure, a method of optimizing scarce organs, in which cadaver heart, liver and kidney were placed into one patient, who donated a liver that would function normally outside his body to someone else.

Some of these same state-of-the-art procedures are now taking center stage at Mayo Clinic in Jacksonville and Scottsdale, where programs are newer, but staff, many of whom trained or worked in Rochester, are already leading the field. Until Mayo Clinic in Scottsdale began its bone-marrow transplant program in 1993, no other hospital in metropolitan Phoenix offered such a service. Likewise, until liver and kidney transplants were initiated in 1999, the city was the largest U.S. metropolitan area without these services.

Similarly, Mayo Clinic in Jacksonville already has begun advancing multiple organ transplants. Its heart-lung program began in 2001, adding to a portfolio that already included bone-marrow transplant, 1992, liver, 1998, and kidney/pancreas, 2000. In 2002, Pam Gill, a 43-year-old former telemetry technician, received a life-saving heart, double-lung, and liver transplant, after being turned down by other institutions as too sick. Her quadruple procedure was only the fourth such transplant in the nation and the second for a Mayo Clinic team.

“These transplants can only be done in a handful of centers,” says Jeffrey Steers, M.D., director of the transplant program in Jacksonville. “Were we not here, I’m confident Mrs. Gill would never have received the transplant.”

Dr. Keller agrees, adding that what makes Mayo Clinic’s program successful is Mayo’s approach and commitment, which ensures the adequate space, established personnel and appropriate ancillary services necessary to be successful. “When your institution has such a well-defined plan, then things have a chance to run well,” he says.

Stretching the field

Patients also benefit from an array of Mayo Clinic scientists working at the forefront of the field to advance knowledge of organ replacement. Through Rochester’s Transplantation Biology Program, for example, researchers are exploring novel ways to generate new organs for the 80,000-plus transplant candidates waiting for donor organs each day.

Techniques such as cellular transplants, stem cell tissue engineering and organ development are being pursued as potential approaches for treating transplant patients. Another potential approach is xenotransplantation, a strategy of using the cells, tissues or organs of animals. In the future, xenografts, as they’re called, may be an alternative to human organ grafts for patients with organ failure.

Mayo scientists are actively exploring how the body might react to xenografts and how those grafts can be made less susceptible to rejection. Their research is building on groundbreaking work by Jeffrey Platt, M.D., director of the Transplant Biology Program at Mayo Clinic in Rochester. He was the first to report on the distinct types of rejection in the grafts and the first to propose and test genetically-engineered pigs for xenotransplantation.

Subsequent studies by Dr. Platt and his colleagues already have yielded a better understanding of the molecular defects causing xenografts to fail.

“The remarkable thing is that heart, double-lung transplants are very seldom performed beyond age 55. But, at 62, she’s been doing very, very well with it.”

—Cesar Keller, M.D.
which has also resulted in better ways to make the grafts less susceptible to damage. Their work also set the stage for the preclinical work of Dr. McGregor, who is looking for practical ways to make xenografts work. In animal trials, he has already posted the longest median functional duration — more than 100 days — for a cardiac xenograft.

Still, it may be several years before doctors can offer organs from genetically modified animals that resist rejection or infectious disease. Scientists hope xenografts will be one of several strategies that will be used to replace organ function. While xenotransplantation may never broadly supersede human organ transplantation, they may become the preferred treatment for some conditions, such as liver failure due to viral hepatitis, an infection that would not recur in a xenograft as it might in a human transplant.

“One approach, such as xenotransplantation, may not be the solution to everything,” says Dr. Platt. “It may be that a given technology is successful for one organ but not for another.”

Making all the difference

In the meantime, Mayo’s studies already have generated discoveries with broad implications. Findings on the immune system’s role in creating antibodies for organs, for example, have produced clues on how a cell becomes cancerous and spreads.

The greatest advances, at least for patients such as Hazel, are those that improve organ outcomes and transplant care. One year after her surgery, follow-up biopsies and other tests have shown that her new organs are functioning superbly, with no hint of rejection. “The remarkable thing,” says Dr. Keller, “is that heart, double-lung transplants are very seldom performed beyond age 55. But, at 62, she’s been doing very, very well with it.”

Hazel is no longer tethered to oxygen or afraid to take even the smallest steps. Instead, she is walking a brisk 30 minutes a day, breathing nothing but fresh air. And while she’s on a lifetime drug regimen to ward off rejection, it’s a small price to pay for better health — and time with her husband, Bill. “I’m just happy to be here,” she says.

As for Valentine’s Day 2003? Hazel again spent it at Mayo Clinic in Jacksonville. Only this year there were no ventilators or bedside visits — just a clean bill of health for a heart and two lungs, now packaged neatly inside her chest.
Looking inside the cell
Emerging field of proteomics provides new insights on disease

Farm life is hard on the hands.
Dale Hormann’s 65 years on the land is testament to that — decades of throwing bales of hay, gripping the steering wheel of a tractor or combine, turning a screw driver, guiding a welding torch.

All of this was enough in his mind to explain the hand pain he began feeling about 15 years ago. Besides, he told himself, he was getting to the age where arthritis might start.

So the Alexandria, Minn., man did what any farmer would do: he kept working. He kept working when he began to feel the pain in his legs. He even worked through persistent, chronic diarrhea that eventually caused him to lose 56 pounds.

Dale Hormann worked his 1,000 acres of soy beans and wheat for 10 more years after the first twinges of pain. Then he noticed he didn’t have the steady hand he once did while welding. Finally, when the pain got to be too much about three years ago, he consulted area doctors. They felt confident enough in a diagnosis of carpel tunnel syndrome to proceed with hand surgery. Back surgery followed.

Neither treatment helped. “I was losing feeling in my legs and hands, and it hurt so bad,” Dale says. “Finally, when nothing was getting better, I went down to Rochester, to Mayo. That turned everything around.”

The reason: An innovative combination of the most ancient form of medical science — close, thorough, thoughtful examination of the patient — and the most sophisticated modern technologies, including a new subspecialty of molecular biology called proteomics. This comprehensive approach revealed the true source of Dale’s ills. He suffers from a rare hereditary disorder of liver proteins called familial amyloidosis.

The diagnosis itself was a relief. “It took 67 tests — I counted,” Dale says with a laugh. “It’s just good to get the wondering over.”

While Dale’s wondering may be over, the fact remains that the news is mixed.

There is currently no cure for familial amyloidosis — except a liver transplant, but that procedure is only suitable for younger people. And his symptoms are not entirely controllable. But being off the “medical treadmill” of going doctor to doctor until Mayo finally diagnosed his problem is a big improvement in his life — as is the power to plan his life once again.

Perhaps more importantly, the diagnosis allows his children to plan their lives, too. Because this disease is inherited — and because of Mayo’s expertise in its genetic basis and pioneering use of technology to perform molecular analysis — Dale’s children are among the very few potential carriers of familial amyloidosis anywhere in the world who can take advantage of novel testing methods to determine if they are at risk for the disease before the symptoms develop. This knowledge will allow them to plan for the only medical treatment available — a liver transplant — while they are still young enough to be eligible for the procedure.

How proteomics can help

With the fall 2002 opening of the Mayo Proteomics Research Center in Rochester, Dale’s children gained a vital ally in their personal health care. That’s because the center is one of a dozen sophisticated proteomics laboratories in the world capable of such comprehensive analysis of cellular proteins.

The proteins that are studied at the Mayo Proteomics Research Center make up only one component of a cell. Yet they play a key role in disease development. Indeed, scientists believe proteomics, as the study of proteins is called, may hold the key to many advances in both the diagnosis and treatment of disease.

Closely related to genomics, proteomics is the study of the structure, function and expression of cellular proteins. It is the newest subspecialty of molecular biology.
The term proteomics was coined in 1994 by an Australian graduate student. Researchers in the Mayo Proteomics Research Center worked with Dale’s physician to design an experimental blood test that in just 30 minutes could tell Dale’s children if they, too, are at risk for the disease that has disabled their father. Dale’s brother and four sisters are having their blood tested as well, although they have no symptoms of the disease.

“This is the kind of disease that, if you don’t know what you’re looking for, you won’t find it. We’re fortunate at Mayo because we have incredible depth of experience with the entire family of diseases known as amyloidosis.”

—Steven Zeldenrust, M.D., Ph.D.

And you need Mayo’s unique interaction between basic scientists and clinicians, according to David Muddiman, Ph.D., director of the W.M. Keck FT-ICR Mass Spectrometry Laboratory, which is part of the Mayo Proteomics Research Center.

“For a researcher like myself, the opportunity to collaborate directly with a physician like Dr. Zeldenrust and patients like the Hormann family is really a privilege,” says Dr. Muddiman. “To see patient care improve as a result of this is a phenomenal feeling. It’s what Mayo is all about. We know that familial amyloidosis causes plaques to form throughout the body. At the Mayo Proteomics Research Center, we can examine the protein involved and tell if a genetic variant gave rise to the disease.”

Rajiv Kumar, M.D., chair of the Mayo Proteomics Research Center, says the new facility provides investigators at Mayo Clinic in Rochester, Scottsdale and Jacksonville with the necessary tools for understanding the origin and development of a wide variety of diseases. “These tools will most certainly lead to the development of important new methods for diagnosis and treatment of a wide range of diseases,” says Dr. Kumar.

Why proteomics is needed

While genes direct the formation of proteins, it is proteins working within the cell that do the actual work of all human biological systems. So by examining specific proteins, and their actions and interactions, investigators can make discoveries that can lead to the creation of a new generation of medications and treatments. This study holds extraordinary promise for 21st century medicine.

To develop these tools, scientists need to know the protein structures as precisely as possible. This is a daunting task on several levels. First,
there is the sheer number of proteins in an adult human. There may be thousands to more than 1 million. And those proteins change — they fold, unfold, change their functions, interact with other molecules.

To conduct the advanced analysis needed to shed light on protein structure, expression, interaction and function, the Mayo Proteomics Research Center marshals resources — such as the world’s only 12-Tesla Fourier Transform Ion Cyclotron Resonance Mass Spectrometer for the study of proteins and DNA — and multidisciplinary collaborations that few, if any, other medical centers can.

The potential of these combined resources to improve disease diagnosis and treatment is enormous, according to Thomas Spelsberg, Ph.D., chair of the Mayo Clinic Genomics Education Program, a pioneering effort aimed at helping clinicians harness the power of genomics.

“Combined, genomic and proteomic information are predicted to revolutionize medical care and clinical research by yielding new, more accurate diagnoses and classifications of diseases; by leading us to the development of a multitude of new drugs, therapies and cures; and finally, by enabling scientists to predict a patient’s predisposition to a given disease years before its onset,” says Dr. Spelsberg. “The positive potential here is just incredible.”

Bringing science to patient care

Dale Hormann’s experience is an example of what Dr. Spelsberg is talking about. The blood test developed at Mayo Clinic identified a mutated protein responsible for his nerve and gastrointestinal problems. This spring, that test will be used to see if his sons are at risk for the disease.

This progress was made possible by three uniquely Mayo features: a collaborative practice that brings researchers and clinicians from different disciplines together; an excellent educational background in genomics and proteomics; and the advanced scientific expertise and technology available at the Mayo Proteomics Research Center.

Together, they worked to provide the medical help, and the hope, Dale needed. And they may be able to tell his sons what their future holds — before symptoms develop, and while they are young enough to take action.

If the blood test developed for the Hormanns can be developed into a standard clinical test that meets validation standards, it will then be widely available to other patients. If the new blood test passes Mayo’s stringent internal review process, it will become one more laboratory test that Mayo clinicians will have in their vast diagnostic repertoire. Investigators are hopeful that it will become available for clinical diagnostic use sometime in the next year or two.

Dale says that possibility is deeply satisfying to him. “It would give me a good feeling to know they learned something from all I went through. I signed all the papers at Mayo to do all the experiments. I’ll do most anything if it can help the doctors at Mayo come up with something so other people don’t have to go through all this,” he says.

“Patients like Mr. Hormann are an immense help to research that has the potential to vastly improve clinical practice,” says Dr. Zeldenrust. “Our hope is that with continued research and early diagnosis, we’ll be able to do more for patients by designing more effective treatments — even cures.”
Pam Swanson lay in a hospital bed — severely dehydrated, drifting in and out of consciousness and in a great deal of pain. Her hometown doctor told her husband, Jerry, she needed to get back to the specialists at Mayo Clinic as soon as possible.

Pam’s condition was serious and getting progressively worse. She was experiencing complications that developed quickly a few months after she returned home from a successful pancreas transplant at Mayo Clinic in Rochester.

But the Swansons were in Jackson, Miss., and Mayo Clinic was more than 1,000 miles away.

Jerry had picked up a pamphlet about medical transportation when they were in Rochester for Pam’s surgery.

It was mid-morning when he made a call to Mayo Medical Transport. That afternoon Pam Swanson arrived at Rochester Methodist Hospital, a Mayo hospital in Rochester, and was greeted by the physician who managed her care when she had her pancreas transplant.

“I called Mayo Medical Transport and said, ‘Here we are, a thousand miles away in Jackson, Miss. We’re in trouble, and we need your help to get my wife to Rochester,’” Jerry recalls.

He started to feel a little better while talking with the emergency medical dispatcher who answered the call in the Emergency Communications Center at Mayo Clinic.

“He was calm, confident and reassuring,” Jerry says. “He asked about the nearest airport and how soon my wife could be ready for transport. I provided the medical information about my wife, and he said he would call right back. He called 15 minutes later and said they were preparing to depart Rochester. He had selected the medical team to come to Jackson and told me the Mayo MedAir aircraft would be fueled and ready to transport her at 2 p.m. It was just a tremendous weight off my shoulders.”

Mayo MedAir is a long-distance connection to Mayo Clinic from anywhere in the United States and international locations. This air ambulance transports and cares for critically ill, injured and relatively stable patients 24 hours a day, 365 days a year, anywhere in the world.

Mayo MedAir is part of a network of medical transportation options available through Mayo Medical Transport.

Mayo MedAir is configured and equipped as a mobile intensive-care unit. Care is provided during transport by staff who are supported by equipment comparable to that available in an emergency room or critical-care unit. A communications system is in place that allows the health-care team to communicate in real time with specialists at Mayo Clinic.

The medical team is hand-picked, based on the patient’s needs, and may include critical-care nurses, paramedics, pediatric and neonatal specialists, physicians, respiratory therapists or other health-care professionals. In Pam Swanson’s case, the medical staff included a nurse and a paramedic trained in critical care and the care of transplant patients.

The Mayo Clinic staff (in Rochester and aboard Mayo MedAir) and Pam Swanson’s health-care providers in Jackson exchanged information about her condition, and Pam was taken by ambulance to the Jackson airport.

“It was so reassuring to see the MedAir plane waiting at the airport when we arrived in the ambulance,” says Jerry. “They were extremely professional, but more than professional, they were very caring. I was nervous and upset, but I calmed down when I saw that they knew what they were doing. They had her records and understood what her situation was.”

“I was so ill at the time that I don’t remember a lot of what happened,” says Pam. “I do remember that when they met
me at the airport, I was frightened, in pain and afraid of being moved.

“But I remember their soft hands and the way they put me up into the airplane. They were so professional and yet so caring. I knew at that moment that’s why I go to Mayo Clinic — to get that extra, professional, group care that they put together as a team. I just knew I was in good hands, and I knew where I was going — and that made all the difference in the world.”

Jerry Swanson agrees: “It was very comforting to know we were two hours or less away from Mayo Clinic. I knew that the people on the transplant wing would have her then, and they knew exactly what to do and how to solve her problems. At that point, I knew that the unknown was behind us.

“When you’re in Mayo MedAir, you know you’re not alone. You are getting expert care on the plane, and they are in contact with the doctors at Mayo Clinic and the hospital staff.”

Mayo MedAir’s in-flight team is supported by a team of specialists and critical-care physicians at Mayo Clinic who are available for consultations. The supplies on board include an external defibrillator, an external pacemaker, and more than 60 medications. The patient care team members who fly on the aircraft also respond to emergency medical situations aboard Mayo One emergency helicopter and Gold Cross ambulance, so they have extensive experience caring for patients in a variety of situations.

“The goal for Mayo MedAir, is to bring the Mayo Clinic standard of care to the patient,” says David Claypool, M.D., medical director for the fixed-wing air ambulance program. “Our crews do more than transport patients. They’re trained and have the skills and experience to provide the highest level of patient care while they are en-route to Mayo.”

Behind the scenes

The Emergency Communications Center in Rochester, which was Jerry Swanson’s connection to Mayo’s medical transport services, provides 24-hour dispatching for every mode of transportation. More than 100,000 calls a year come through the Emergency Communications Center.

Emergency medical dispatchers work with callers to determine the best medical transportation option based on their conditions. They arrange transports by air or ground, dispatch medical response for 911 calls, and provide instructions for callers on what to do until help arrives. The Emergency Communications Center is staffed and equipped to handle any medical need.

“Our medical transport team extends the continuum of Mayo Clinic care to wherever the patient may be, and virtually whatever the medical condition.”

—Scott Zietlow, M.D.
The ambulance that took Pam Swanson from Rochester Airport to the hospital was part of Mayo’s Gold Cross ambulance service. Each Gold Cross ambulance is staffed by two paramedics or an emergency medical technician/paramedic team and includes sophisticated life-support equipment previously only available on air medical transportation.

Also part of the Mayo Medical Transport network is the Mayo One helicopter fleet, which serves the critical care, emergency and transport needs of patients who are closer to Mayo Clinic facilities. A helicopter can be in flight within minutes, 24 hours a day, every day. Mayo One is staffed by at least two medical professionals and may include a critical-care nurse, critical-care paramedic, physician or neonatal and pediatric specialty teams. The in-flight team also is supported by specialists at Mayo Clinic facilities.

The medical equipment and medications on board make Mayo One a mobile emergency room, equipped to handle nearly any patient with serious trauma or who is moderately to critically ill.

Through the use of an advanced global positioning system (GPS), Mayo One helicopters are able to fly in fog and reduced-visibility weather and to pinpoint the location of accident scenes. The system allows the Emergency Communications Center to track helicopters in flight.

Scott Zietlow, M.D., medical director of Mayo Medical Transport system, says the transport team is always striving to improve service and evaluate emerging technologies. Mayo Medical Transport physicians and staff work together to implement patient care procedures and standards, monitor the overall quality of care, and utilize new technologies. “We have a highly-skilled team that is paired with the latest technology and equipment,” says Dr. Zietlow. “Our medical transport team extends the continuum of Mayo Clinic care to wherever the patient may be, and virtually whatever the medical condition.”

Like coming home

Pam Swanson doesn’t remember much about her first few hours in Rochester. Mostly, she reports feeling a sense of relief. “I just felt like I was home, in a comfort zone,” she says.

“When we landed in Rochester, it was cold, but the plane was backed into a heated hangar and the ambulance was there waiting,” says Jerry.

“From the time the plane door opened, we never stopped. We had Pam in the ambulance going to the hospital immediately, and we went right through patient receiving. It was amazing. They already knew who we were and where we were going.

“And the physician who cared for her when she had the pancreas transplant was waiting for her, telling her they would have her feeling better shortly.”

And they did. According to Jerry, in about four hours his wife was showing dramatic improvement.

The complications dealt with, Pam was back to her recovery and continues to do well. Her pancreas transplant rid her of her diabetes and its complications.

The connection to Mayo Clinic care from Jackson was key to her continued health, and it continues to provide reassurance should any other issue arise.

“You couldn’t have written a script any better than what happened that day,” says Jerry, recalling the teamwork, technology and expertise that brought Mayo Clinic care to his wife.

“I don’t have diabetes anymore; my life is totally different,” says Pam. “I can enjoy time with my child now. My husband and I have a life. I can enjoy living in Jackson knowing that Mayo Clinic care is always quickly and easily available. My doctor here in Jackson is in contact with my doctors at Mayo Clinic. They are working together to monitor my health, and they are all doing a tremendous job. It’s like Mayo Clinic is just around the corner.”
George Tesmer Sr. was worried. His diabetes had caused a dangerous elevation in his blood sugar levels, prompting his physician to hospitalize him until the levels could be normalized. As he walked toward the nursing station at Lake City Hospital, his head was full of questions. He didn’t feel well. And he was afraid.

Enter Deb Kohrs, then working as unit coordinator of the nursing station.

“Deb came to me as soon as she saw me coming down the hall,” remembers George. “She greeted me and started telling me about her grandfather, who also had diabetes. I was feeling really bad, and having her talk to me cheered me up.”

All in a day’s work for Kohrs.

“I believe it’s important to treat patients as friends,” she says. “People are more than just a number.”

Kohrs has worn many hats throughout her 23-year career at Lake City Medical Center, part of Mayo Health System in Lake City, Minn. But her current position as a receptionist at the front desk is perhaps the best fit. She is the first person patients see when arriving at the medical center, and they often reach her desk anxious about their appointments. Kohrs takes pleasure in doing more than simply noting a patient’s arrival or updating medical forms.

“Quality care starts at the front desk,” says Kohrs. “We’re the first contact patients have when they come through our doors. I try to greet patients by name and chat with them to help them relax. It’s part of providing the best quality care, making them comfortable in this setting.”

Service makes the difference

That perspective may be different than what health-care organizations are used to. But within Mayo, it’s both a tradition and a continuing emphasis.

In fact, Mayo Clinic recently worked with Leonard Berry, Ph.D., a distinguished professor of marketing at Texas A&M University to conduct the largest service study ever conducted at Mayo. Dr. Berry has devoted his career to studying service quality and has published several books on the subject. In 2001 and 2002, he spent a yearlong sabbatical conducting the service study at Mayo.

Dr. Berry’s goal was to determine what qualifies as ideal service from the perspective of patients, physicians, nurses and allied health staff. His research showed that everyone — from physicians and nurses to billing and maintenance staff — contributes to patients’ experiences. And whether those employees go above and beyond what is written in their job descriptions makes a difference in a patient’s care.

“Patient service begins before the episode of medical care and doesn’t end after the episode of care,” says Dr. Berry.

Like Deb Kohrs, the best service employees are those who try to anticipate patients’ needs. They see the world through the eyes of a patient. “I try to imagine how I would want to be treated if I were on the other side of the desk,” says Kohrs.

Her attitude is an expression of Mayo’s foremost value: the needs of the patient come first. And that value has been reflected in an atmosphere of service that has permeated the institution throughout its history.

At the same time, Mayo recognizes that continued advancement takes a coordinated, concerted effort. Efforts to advance service to patients and visitors were on display at Mayo’s recent annual Conference on Quality.

“Our Conference on Quality gives staff members an opportunity to showcase their efforts to improve patient care or solve a problem in their work areas,” says Gene Dankbar, a continuous improvement coordinator at Mayo Clinic in Rochester. “It is a time to share and celebrate our successes.”
More than 1,000 staff members attended the recent conference, and more than 100 groups showcased their continuous improvement projects. Many of these efforts are directly focused on improving the service patients experience at Mayo.

Mayo recognizes that quality service affects the entire patient experience. Patients come to Mayo Clinic for medical care, but the service they receive can affect their medical outcomes and their perceptions of the institution. “We have a history of providing excellent service and quality at Mayo, but the focused efforts of teams throughout the organization are raising our standards even higher,” says Dankbar.

“The way patients and their families are welcomed and cared for makes a big difference in how they view a medical center,” says Katherine Reller, also a continuous improvement coordinator at Mayo Clinic in Rochester. “We have high standards for service excellence, and we want each and every patient to have the best Mayo experience.”

That sort of service emphasis will be key to the success of medical centers across the country in the future, according to Reller.

**Every patient, every day**

The findings of Dr. Berry’s service study have been shared throughout Mayo and have inspired many additional service efforts. One example is the work in the Department of Internal Medicine at Mayo Clinic in Rochester.

“We feel we’ve always provided good service,” says Mike Schryver, administrator of outpatient practice in the Department of Internal Medicine. “In fact, we pride ourselves on it. But we want to make our level of service consistent. For example, if you go to a Ritz-Carlton Hotel anywhere in the world, you know you’ll receive the same high level of service in every encounter. We want to be sure we offer our patients that type of experience from the time they walk through our doors until the time they leave.”

The department did its own research, soliciting input from patients and staff about what ideal service means to them. As a result, they developed service standards and are in the process of educating all staff on those standards. One of the most popular components of the training program has been a video demonstrating good service, poor service and missed opportunities for service. It is this last category that is of most interest to staff.

“Missed opportunities aren’t as obvious as poor service,” says Schryver. “That’s where we have an opportunity for improvement. Our service ratings are already high — around 90 percent of our patients rate us as excellent — but we want to raise that level to 100 percent. The way to do that is by turning missed opportunities into good service.”

Similarly, Mayo Clinic in Jacksonville is becoming known for its quality service and customer satisfaction. After studying the success of customer service leaders such as the Walt Disney Company, Ritz-Carlton Hotel and Baptist Healthcare in Pensacola, Fla., staff at Mayo Clinic in Jacksonville developed their own set of service values.

“We wanted to have service values that would show patients that their needs are our first priority,” says Jane Ford, an associate administrator at Mayo Clinic in Jacksonville.

As a result, all staff at Mayo Clinic in Jacksonville are now completing a four-hour training program called “Mayo Service Values: You Make the Difference.” The program provides definitions for Jacksonville’s six service values: teamwork, personal responsibility, integrity, innovation, communication and mutual respect.
The ultimate message of the training program?
“We want each staff member to know that it’s everyone’s job to put the pieces of the puzzle together to provide excellent patient care,” says Ford. Graduates of the training sessions are given pins in the shape of puzzle pieces to remind them of their important role in completing the patient care picture.

At Albert Lea Medical Center, part of Mayo Health System, in Albert Lea, Minn., staff members recognized that they were missing a piece of that puzzle. While an increasing number of the medical center’s patients speak Spanish as their primary or only language, until recently the medical center had very few bilingual staff members. To better serve Spanish-speaking patients, Albert Lea Medical Center created a program called “Bridging Cultures” designed to improve the communication, education and support provided to the changing community. The medical center has increased its bilingual staff, hired a cultural services coordinator, and dedicated a phone line specifically for assisting Spanish-speaking patients.

“Our efforts have been well-received in the community,” says Tonia Lauer, an administrator at Albert Lea Medical Center. “We are seeing more Spanish-speaking patients, including some from surrounding areas who have heard about our services through friends and family members.”

Keeping the focus in focus

The efforts under way throughout Mayo may look different, but they are all focused on improving customer service.

“Our patients are our customers,” says Schryver. “They are well-educated consumers of health care. And to be considered a leader in health care, you need more than medical expertise. You have to provide a high level of service as well.”

Deb Kohrs understands that.

“Truly caring for our patients is the right thing to do,” says Kohrs. “But it also increases the likelihood that patients will choose to come back to us whenever they need health care.”

Which brings us back to George Tesmer.

“I could go someplace else for my care, but I choose to go to Lake City because they treat me so well,” says George, who lives in Millville, Minn. “When I had a heart attack a few years ago, my daughter-in-law called the hospital to tell them we were coming in. Deb met us at the door with a wheelchair. You don’t get that kind of caring just anywhere.”
Reaching out from within
Providing care to communities in need brings personal and professional rewards

he remembers them vividly: the faces of the patients she cared for in Haiti.

The elderly woman with hands gnarled by arthritis and vision obstructed by cataracts. The young woman — only 32 — with metastatic breast cancer. The many children whose aching stomachs kept them from sleeping.

Though they are far away, Jessica Ellsworth, M.D., a third-year family practice resident physician at Mayo Clinic in Scottsdale, can still see the faces of these patients. She remembers their dire circumstances. And she remembers their smiles, the gratitude for the care they received.

Dr. Ellsworth and her fellow resident physicians from Mayo Clinic were the best chance many of these Haiti residents had to receive medical care. In Haiti, there are about eight physicians per 100,000 people. In many of the places the Mayo team visited, there were none.

The patients Dr. Ellsworth remembers are among more than 16,000 patients who have received care through the Mayo International Health Program. This program enables residents and fellows in any of Mayo Clinic’s clinical training programs to complete a portion of their training in medically underserved, international settings. But the patients aren’t the only ones who benefit from the experience.

“I come back from Haiti with my soul refreshed,” says Dr. Ellsworth, who has served in Haiti on two occasions. “The rotations have renewed my commitment to service and medicine. And they have increased my compassion for all of my patients.”

Mark Rieder, administrator of the Mayo Graduate School of Medicine, has witnessed a similar transformation in other program participants.

“The residents and fellows who participate in rotations through the program come back convinced they have a responsibility to give of themselves to help those less fortunate,” he says. “The program sets the stage for tomorrow’s physicians, ready to serve the increasingly diverse patient population in our country and worldwide.”

Turning experience into opportunity

Furman McDonald, M.D., a physician at Mayo Clinic in Rochester, saw firsthand the disparity in medical care available throughout the world when he traveled to Kazakhstan when he was a student at Mayo Medical School. His experience led him to spearhead the creation of the Mayo International Health Program.

Dr. McDonald’s trip during medical school was made possible through Mayo’s Hoffman Fund, which offers financial and logistical support to medical students interested in providing care in medically underserved areas. Dr. McDonald spent six weeks caring for patients in Kazakhstan, and describes the experience as “life changing.”

“I saw medicine practiced without the diagnostic and testing resources we have here,” says Dr. McDonald. “We were truly laying our hands on patients, relying only on medical histories and symptoms presented.”

The experience proved so valuable to Dr. McDonald’s development as both a physician and a human being that he wanted to repeat it during his residency at Mayo. And he wanted to provide others with the opportunity for similar personal and professional growth. So Dr. McDonald enlisted the help of two fellow resident physicians, Ronnier Aviles, M.D., and Melissa Meredith, M.D., and together they secured Mayo’s help and created the Mayo International Health Program.

The program today is co-sponsored by the Mayo Fellows Association and the Mayo Graduate School of Medicine. Mayo Clinic physicians and administrators volunteer their time to manage the program.
Its goal: to expand resident physicians’ experiences and expose them to different cultures while extending their medical experience and expertise, and at the same time to provide badly needed help to those with little access to even basic medical care.

More than 35 individuals in Mayo’s training programs have participated in the program since its debut in 2001. Program participants choose to use their valuable elective time providing basic medical care rather than gaining experience in a medical specialty area. They often dig into their own pockets to fund their trips, since the stipend given to support the rotations rarely covers all of their expenses. But there’s no questioning the true value of the experiences.

“The program helps residents and fellows see what medical care is like in another country,” says Dr. McDonald, who is now a member of the committee that oversees the program. “It gives people a chance to diagnose and treat diseases they wouldn’t usually see in Jacksonville, Rochester or Scottsdale. And it gives them a chance to provide medical care to people in dire need. On a personal level, that’s very rewarding.”

Meeting a need

People living in many parts of the world would not receive medical care were it not for the efforts of physicians involved in humanitarian efforts such as the Mayo International Health Program. In many countries, there are few physicians and scant resources available for medical care. The World Health Organization estimates that Haiti has eight physicians and one dentist per 100,000 people; Kenya is estimated to have 13 physicians and two dentists serving the same number of citizens. In comparison, the United States is estimated to have nearly 300 physicians and 60 dentists providing care for every 100,000 people.

These are not the only factors limiting the care patients receive in many countries; facilities and supplies also determine how much a physician can do for a patient. Dr. Ellsworth’s experiences in Haiti have given her an appreciation for the resources available to patients in the United States.

“Our team traveled around Haiti providing care in established clinics and in temporary clinics,” she says. “There wasn’t much difference between the facilities. We never had water or electricity. In the nicest of situations, there would be a sheet hanging from the ceiling to create a private space for exams.”

When Dr. Ellsworth and her colleagues were preparing for their second trip to Haiti, they knew what they needed to bring with them: more of everything. So they enlisted more physicians, including two internal medicine specialists and two dermatologists. They recruited nonmedical volunteers. And they brought plenty of supplies, including gloves, gauze, bandages, vitamins, antibiotics, and antifungal and antiparasitic medications. The supplies, which group members purchased with their own money or secured through donations, were impounded at the airport in Haiti. After a few hours of persuasive conversation, along with a $25 fee, the group was reunited with the supplies.

“In Haiti, we saw many people with the most ordinary of ills,” says Dr. Ellsworth. “We also saw children who couldn’t sleep because they had worms.
and their stomachs hurt. We saw adults with fungal infections, and people of all ages who were malnourished. Being able to treat these patients and to know that they were going to be feeling a lot better was very rewarding."

In one week, Dr. Ellsworth and her colleagues cared for 3,500 patients. The number still amazes her.

"On our first day in Haiti, we were told there was a village in the mountains that had no access to medical care," says Dr. Ellsworth. "We were asked to go there and see 4,000 patients. We didn’t have the staff or supplies to see that many patients but offered to go and see 1,000. On our last day, we finally got to travel to the village and managed to see more than 1,000 patients during that one day."

Expanding horizons

The Mayo International Health Program also seeks to increase participants’ cultural awareness. Gaining an understanding of the medical and cultural practices of other countries helps prepare them to care for the diverse group of patients they will encounter in the United States.

Grettel Wentling, M.D., chief general surgery resident at Mayo Clinic in Jacksonville, spent a month caring for patients at St. Mary’s Hospital in Nairobi, Kenya. The trip marked the third time Dr. Wentling had traveled to Africa to care for patients; the first two trips took place while she was a student at Mayo Medical School and were supported by the Hoffman Fund.

"Practicing medicine in another country really, really stretches you," says Dr. Wentling. "You have to work without the instruments and equipment you are used to. And there are cultural differences to adjust to as well. For example, African people won’t tell you if they are in pain. That changes the way a physician evaluates a patient."

Dr. Wentling also found that general surgeons in Kenya see a wider variety of cases than their counterparts in the United States. "I had exposure to an incredible array of cases, from orthopedic injuries to massive goiters to breast cancer and gynecologic emergencies," she says.

While Dr. Wentling was unable to speak with her patients in Africa, she found a way to communicate with them nonetheless.

"I learned quickly that a smile is universal," she says. "Your attitude makes such a difference to a patient who is scared. All you have to do is smile and you’ll put them at ease."

And to Dr. McDonald, that sort of education and insight that comes from experience, that understanding, is the real magic of the Mayo International Health Program.

"We have patients coming to Mayo from all over the world," says Dr. McDonald. "Having physicians who have lived and worked in different countries is a tremendous benefit to our patients."

When Barbara Simonds and her husband, Chandler, come from their home in Pennsylvania to Rochester for her annual checkup, she gets a lump in her throat as they approach the first view of Mayo Clinic.

“This is where I was given my life back — where my confidence and trust lie,” says Barbara. “Mayo is my ‘Land of Oz,’ with all the wonder and hope of medical answers and treatments unparalleled by any other.”

Barbara’s Mayo experience began with treatment for Cushing’s disease, a rare condition in which a tumor on the pituitary gland causes a variety of debilitating symptoms.

In 1988, Barbara was experiencing various symptoms that affected her day-to-day living. Having spent three years trying to determine the cause of the symptoms and being hospitalized twice, she was sent home with no conclusive diagnosis or treatment. Then, a family friend who had visited Mayo Clinic on business-related matters advised Barbara to call for an appointment. From her bedside at home, she contacted Mayo, and after describing her symptoms and hospitalizations, was given an appointment for the following week.

After extensive testing, Barbara’s Mayo physicians confirmed a diagnosis of Cushing’s disease. She was immediately scheduled for neurosurgery to remove a pituitary tumor, which had been the cause of her symptoms and illness for the past several years.

Cushing’s disease results from the overproduction of corticosteroid hormones by the adrenal glands. It occurs when a tumor on either the adrenal glands, lung or pituitary gland causes the adrenal glands to produce excess cortisol. The disease is named after Harvey Cushing, M.D., an early 20th century American surgeon.

“Cushing’s disease may be difficult to diagnose because patients often experience nonspecific symptoms ranging from generalized fatigue, to weight gain, to skin rashes,” says Rebecca Bahn, M.D., Barbara’s Mayo Clinic endocrinologist. “It is only by listening carefully to what a patient is saying that the physician can begin to piece together the symptoms and order the proper tests and consultations to make the correct diagnosis.”

For Barbara, treatment for Cushing’s disease was the beginning of a long relationship with Mayo Clinic and the staff who provided her care.

Because of the care and compassion she received, Barbara and Chandler support Mayo Clinic programs aimed at developing new treatments and technology to further medical care and to train the next generation of medical professionals.

Becoming home

Barbara spent approximately one year recovering from the surgery and all of the physical changes caused by her illness. As a part of her recovery, she returned to Mayo Clinic in Rochester for routine lab testing and MRI imaging, along with adjusting specific hormone-replacement therapies.

After her recovery, she was able to return to her passion — developing and implementing comprehensive wellness programs for the Johnson & Johnson family of companies.

It was at work that Barbara and Chandler originally met. Years later, when their career paths crossed again, Chandler had become a company group chairman and Barbara was managing several of Johnson & Johnson’s wellness programs. As their friendship grew, Barbara’s symptoms reappeared, indicating that she had developed a recurrence of the disease.
A second surgery was scheduled at Mayo, this time with Chandler accompanying Barbara for support. For Chandler, the experience on this visit to Rochester was reassuring.

“The coordination from testing to surgery for such a complex condition was something I had never seen before,” says Chandler. “I was impressed with the system by which patients were seen, how Barbara was treated with compassion and care, and the high level of professionalism and expertise.”

In the course of Barbara’s recovery from her second surgery, her relationship with Chandler grew even stronger, and they eventually decided to marry. On one of their return visits to Rochester, they purchased Barbara’s wedding ring from a jeweler near Mayo Clinic because of its symbolism.

“Rochester and Mayo have been a home-away-from-home for her,” Chandler says. “I think she is more at peace in Rochester than in any other place in the world.”

After three years of marriage, Barbara had a third relapse and required additional treatment. She underwent gamma knife radiation and has been in remission for the past two years.

Both Chandler and Barbara have retired and feel fortunate to spend time with family, his children and grandchildren, and friends, and pursue interests such as golf and travel.

Because of her experiences, Barbara also now serves as a resource to provide emotional support to others facing Cushing’s disease. She credits her Mayo endocrinologist, Dr. Bahn, as her inspiration to understand her illness better so that she could cope with it. She is also grateful to Dudley Davis, M.D., her neurosurgeon, who continues to share information on treatments and the latest studies on Cushing’s disease.

“If all doctors had the compassion, patience and expertise as mine, those struggling with serious illnesses would have greater confidence and hope,” Barbara says. “I’ve learned, in my 15-year struggle with this particular illness, how much the physical body can endure and ultimately surmount when given the optimal care. That’s all I could ask for, and that’s exactly what Mayo has given me.”

**Perpetuating the Mayo legacy**

The Simonds also are investing in a healthier tomorrow through their membership in The Mayo Legacy. The Mayo Legacy is an organization of patients, friends and staff who make planned gifts, such as a bequest in a will, to support Mayo Foundation.

Established in 1990, The Mayo Legacy now has 2,800 members in 49 states and 14 countries. Barbara and Chandler’s gift designates that the proceeds from their trust be used by Mayo for research into Cushing’s disease and other medical research.

“It’s rewarding to see a patient not only recovering but also giving back to others, both through support for others with Cushing’s disease and by supporting further research efforts,” says Dr. Bahn.

In 2002, Mayo Foundation received contributions of $121 million from almost 56,000 benefactors. This total — the fifth highest in Mayo’s history — came during a year of economic uncertainty. Looking ahead, 444 benefactors have informed Mayo that they will provide about $72.5 million in future gifts.

Mayo Clinic depends on private support to help construct state-of-the-art laboratories, libraries and patient-care facilities, as well as to fulfill its mission to train future leaders in health care and conduct pioneering research.

“It’s rewarding to see a patient not only recovering but also giving back to others, both through support for others with Cushing’s disease and by supporting further research efforts.”

—Rebecca Bahn, M.D.
Mayo’s benefactors come from throughout the United States and around the world. They represent diverse walks of life. Yet what they share is more important — a desire to advance medical progress by supporting Mayo’s facilities, programs and endowments. Mayo Clinic patients, staff and alumni, the general public, as well as foundations and other philanthropic organizations, all provide generous support.

Philanthropy, which derives from Greek terms for “love of humanity,” is a deeply rooted value at Mayo Clinic. In the early 1900s, Drs. William J. and Charles H. Mayo gave the assets of their private medical practice and the majority of their personal savings to create what today is Mayo Foundation. Generations of benefactors have continued this tradition of generosity.

The Mayo Foundation Department of Development began in 1970, as Mayo was making plans to establish a medical school. Since that time, philanthropy has had a profound impact on Mayo’s progress. During the past 32 years, benefactors have contributed more than $1.4 billion to Mayo. Today, philanthropy plays a vital role in supporting Mayo’s biomedical programs and construction projects.

“Philanthropy strengthens every aspect of Mayo’s mission to provide leadership in medical care, research and education,” says David Ahlquist, M.D., medical director for development at Mayo Clinic.

In 2002, for example, benefactors supported the outfitting of the Gonda Building at Mayo Clinic in Rochester. Benefactors also have made generous commitments to Mayo’s plans for constructing a hospital in Jacksonville and expanding Mayo Clinic Hospital in Phoenix. The wide-ranging research programs and five schools of biomedical education at Mayo Clinic also received significant support.

Many of Mayo’s benefactors share Barbara and Chandler’s desire — to make a difference through the institution that made such a difference for them.

For more information on philanthropy at Mayo, call 1-800-297-1185 or visit www.MayoClinic.org/development.
Patient care

Mayo Clinic’s designation as a comprehensive cancer center in Rochester, Minn., was extended to include Mayo Clinic locations in Scottsdale, Ariz., and Jacksonville, Fla. Mayo Clinic is the first multi-center clinic in the United States to receive comprehensive cancer center designation by the National Cancer Institute for its entire cancer program.

Transplant surgeons at Mayo Clinic in Jacksonville performed a rare four-organ transplant. The patient was only the fourth person in the United States to receive a transplant of the heart, two lungs and liver. One of the previous quadruple transplants was performed at Mayo Clinic in Rochester. Earlier in 2002, the first combined heart and lung transplant at Mayo Clinic in Jacksonville was performed.

Researchers at Mayo Clinic in Rochester developed a new imaging test for diagnosing breast cancer. The new test, magnetic resonance (MR) elastography, uses a combination of sound waves and MRI to detect breast tumors. In the future, this could mean earlier and more reliable diagnosis of breast cancer.

Surgeons at Mayo Clinic in Rochester began using robotic “hands” to perform complex laparoscopic surgery. This minimally invasive technology, called the da Vinci system, enhances a surgeon’s skills and often results in a faster recovery time for patients. It was approved in 2001 and now is available in only a handful of medical centers.

Mayo Clinic in Scottsdale became one of seven locations worldwide with a new mobile cancer radiation technology, called the Mobetron, used for patients with advanced colorectal, gynecologic and renal cancers. The technology is one of the world’s most advanced and effective forms of cancer-fighting radiation therapy.

Mayo Clinic in Rochester participated in a National Eye Institute study on using eye drops vs. a patch for children with amblyopia, or lazy eye. This study found that atropine eye drops given once a day to treat lazy eye — the most common cause of visual impairment in children — work as well as the standard treatment of patching one eye.

Mayo Clinic physicians in Rochester found that a risky heart-rhythm disturbance called atrial fibrillation is common in patients with leaky mitral valves. The study showed that repairing the valve surgically should be addressed promptly in patients with atrial fibrillation.
Gastroenterologists at Mayo Clinic in Jacksonville reported that photodynamic therapy appears to destroy the abnormal tissue of Barrett’s esophagus as well as superficial esophageal cancer. At the time of the clinical study, 48 patients were treated with photodynamic therapy.

Surgeons at Mayo Clinic in Scottsdale performed their 100th liver transplant in April 2002. The liver transplantation program in Scottsdale began in 1999.

A clinical study at Mayo Clinic in Rochester showed that cholesterol-lowering statin drugs may help patients with heart valve disease avoid surgery. The findings could lead to the first nonsurgical treatment for aortic stenosis.

Surgeons at Mayo Clinic in Jacksonville began using a surgical procedure to salvage limbs that might otherwise be amputated. Surgeons remove the section of diseased, damaged or dead bone, and then fill the space with a section of living bone. The procedure, called free vascularized fibular grafting, also is used to reconstruct bone at the hip joint that has lost its blood supply.

In June 2002, Mayo Clinic in Scottsdale celebrated 15 years of providing patient care, research and education in Arizona. Since 1987, more than 600,000 patients from around the world have traveled to the clinic for care.

Mayo Clinic celebrated a milestone of biomedical research with the opening of the Mayo Proteomics Research Center in Rochester. The center focuses on the role that proteins play in directing cellular behavior and is one of only a dozen such centers worldwide.

An international clinical study led by researchers at Mayo Clinic showed that radio-frequency ablation significantly reduces pain and enhances quality of life for patients whose cancer has spread to the bone. The study led to the Food and Drug Administration approval of this treatment in some cancer patients.

Mayo Clinic in Scottsdale joined three other prominent research institutions to establish the Arizona Parkinson’s Disease Center. The center will intensify efforts to find new treatments that will increase the survival and quality of life for patients with Parkinson’s disease.

Mayo Clinic researchers found that the oral combination of the drugs thalidomide and dexamethasone provides treatment benefits equal to or better than chemotherapy for patients who are newly diagnosed with multiple myeloma.

Mayo Clinic researchers found a new clue in the search for a way to stop the tissue damage that occurs in multiple sclerosis (MS) or related diseases of the central nervous system. This was a first-ever finding of the link between an enzyme that may damage tissue and the debilitation that MS patients experience.
Molecular medicine researchers at Mayo developed a “cancer snitch,” a genetically engineered, trackable virus that can keep doctors informed about the progress of viral treatment inside a tumor.

Researchers at Mayo Clinic developed a DNA-based test that can rapidly detect tiny amounts of the deadly smallpox virus. The test has potential to alert local public health officials quickly in the event of a bioterrorism attack involving smallpox, and to more rapidly determine how far the virus has spread.

Mayo Clinic scientists developed a new, more accurate test for strep A that gives final, confirmed results within eight hours — much more quickly than previous rapid antigen/culture method. The new test will enable health-care providers to prescribe antibiotics in a more timely and accurate manner.

A Mayo Clinic study revealed that Prozac, a medication often prescribed for treating depression, can safely and significantly relieve hot flashes in women who have been treated for breast cancer.

Genomic medicine has helped Mayo Clinic researchers find a renewed use for a test once deemed ineffective in detecting a genetic cardiac condition sometimes cited as the cause of previously unexplained sudden deaths. The test is used to determine if patients are at risk of long QT syndrome, the first genetically defined type of arrhythmia to be understood at the molecular level.

Researchers conducting a Mayo Clinic-led study found that a new high-definition technology that involves measurement of the heat patterns created by the face accurately detected lying in more than 80 percent of cases studied. The new high-definition technology can significantly assist authorities in detecting deception.

Education

Mayo Medical School celebrated its 30th anniversary in October 2002. The school enrolls a select class of 42 medical students each year, chosen from more than 2,500 applicants.

Journalists, physicians, government officials, public relations professionals, patients and others came together for Mayo Clinic’s National Conference on Medicine and the Media. Attendees discussed how medical news is shared in the media in hopes of identifying ways to more effectively serve the public.

Mayo Clinic hosted Nobel laureate Elie Wiesel for the annual Occidental Petroleum Nobel Laureate lectureship held in Rochester. Professor Wiesel, a holocaust survivor, human rights activist and scholar, received the Nobel Peace Prize in 1986. The lectureship was established through an endowment from Occidental Petroleum Corporation to Mayo Graduate School to provide a rich educational opportunity for Mayo Clinic staff, students, educators and members of the community.

Three Mayo Medical School students were selected to participate in the Howard Hughes Medical Institute Research Scholars program at the National Institutes of Health (NIH) in Bethesda, Md. Only 60 medical students from all United States medical schools are offered positions in this prestigious research opportunity.
Mayo Clinic in Scottsdale launched the MERIT Center (Mayo Clinic Scottsdale Evidence-Based Clinical Practice, Research, Informatics and Training Center). The center’s curriculum provides staff members, medical residents and fellows with tools and methodologies to apply existing clinical information to medical practice to enhance patient care.

Honors and achievements

- Mayo Clinic nurses in Rochester received the prestigious Magnet Award for Excellence in Nursing Services, the highest level of national and international recognition accorded to organized nursing services. The award is given by the American Nurses Association’s American Nurses Credentialing Center. Mayo Clinic’s award is a re-designation of its original award, meaning it has continued to meet or exceed Magnet Award criteria.

- Lake City Medical Center — part of Mayo Health System — in Lake City, Minn., was selected as one of four national recipients of the 2002 American Medical Group Association Acclaim Award for efforts in preventive care screening, depression care and diabetes care.

- For the fourth consecutive year, Mayo Clinic Hospital was named the number one choice of hospitals in the metropolitan Phoenix area. The award is based on the results of a comprehensive independent consumer research study that is conducted annually.

- Mayo Clinic’s health information Web site, MayoClinic.com, was identified as consumers’ number one-ranked health site in a recent Web site credibility research study. Experts ranked MayoClinic.com number two of the 10 health information sites analyzed, second only to the National Institutes of Health site.

- Mayo One and Mayo MedAir, Mayo Clinic’s emergency helicopter and air ambulance service, were named the air medical industry’s program of the year. The award is presented by the Association of Air Medical Services, which serves providers of air and surface medical transport systems throughout the world.


- Mayo Clinic and IBM announced an agreement to jointly develop an information system designed to give Mayo Clinic investigators access to information that can help them identify potential clinical trial participants faster. When completed, the system could enable Mayo Clinic’s medical staff to quickly draw meaning from a wealth of medical data to support medical treatments.
A brief overview

Mayo Clinic faced significant economic challenges in 2002, but the institution performed well overall due in large part to a continued strong demand for patient care services and effective expense management.

Income from current activities, the best indicator of Mayo’s overall financial performance, was $61.3 million, a 15.2 percent increase from 2001. Income from current activities includes revenue and expenses from patient care and diversification activities (reference laboratory services, book sales, etc.); a consistent allocation from investments; philanthropic support; revenues and expenditures on research and education; and infrastructure and administrative support costs.

All of Mayo’s operations, in Rochester, Jacksonville, Scottsdale and Mayo Health System, made positive contributions to Mayo’s financial results in 2002.

Mayo remains financially sound and well-positioned for the future. Yet, to continue to fuel innovation in diagnosis and treatment of disease, Mayo will need to work in partnership with grateful patients and friends, industry and government to accomplish its objectives.

As a not-for-profit academic medical center, Mayo Clinic has narrow operating margins — the amount of revenue in excess of expenses that can be reinvested in practice innovation, research, education, facilities and technology. Mayo’s mission is to provide the best care to every patient every day. This can be accomplished only through strong programs in medical education and research. To fully support Mayo’s mission, an operating margin greater than the 2002 actual operating margin of 1.4 percent will be required.

With declining Medicare reimbursements and other financial pressures, Mayo will increasingly need to look to extramural funding, philanthropic contributions, partnerships with industry, and diversification activities to fund its research and education programs. In today’s difficult economic climate, these secondary funding sources also are constrained. Prudent long-term financial management will be essential to allow Mayo to continue to be successful in fulfilling its mission.

### Operating performance (In millions)

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2001</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Revenue</td>
<td>4,425.1</td>
<td>4,134.8</td>
<td>7.0%</td>
</tr>
<tr>
<td>Total Expenses</td>
<td>4,363.8</td>
<td>4,081.6</td>
<td>6.9%</td>
</tr>
<tr>
<td>Income From Current Activities</td>
<td>$ 61.3</td>
<td>$ 53.2</td>
<td>15.2%</td>
</tr>
<tr>
<td>Operating Margin</td>
<td>1.4%</td>
<td>1.3%</td>
<td></td>
</tr>
</tbody>
</table>

### Income from current activities — operating margins

- 1998: 2.5%
- 1999: 0.1%
- 2000: 0.4%
- 2001: 1.3%
- 2002: 1.4%
**Patient care**

Income from patient care in 2002 was $125.2 million, an increase of $9.9 million from 2001. This growth is the result of continued strong patient demand for clinical services as well as expense management efforts.

While Rochester, Jacksonville, Scottsdale and Mayo Health System all demonstrated sound financial performance in 2002, declining Medicare payments continue to make it difficult to achieve even a modest margin from patient care.

Mayo Clinic staff served more than 501,000 patients in 2002. Mayo hospitals admitted 124,633 patients during the year, an increase of 2,666 patients, representing a growth in the number of patients with complex illnesses.

**Patient care operating performance (In millions)**

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2001</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Revenue</strong></td>
<td>3,697.6</td>
<td>3,400.6</td>
<td>8.7%</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td>3,572.4</td>
<td>3,285.3</td>
<td>8.7%</td>
</tr>
<tr>
<td><strong>Income from patient care</strong></td>
<td>$ 125.2</td>
<td>$ 115.3</td>
<td>8.6%</td>
</tr>
<tr>
<td><strong>Operating Margin</strong></td>
<td>3.4%</td>
<td>3.4%</td>
<td></td>
</tr>
</tbody>
</table>

**Income from patient care — operating margins**

1998: 4.3%  1999: 2.6%  2000: 3.0%  2001: 3.4%  2002: 3.4%
Investing in education and research

Mayo continues to invest in education and research, both of which are essential to Mayo’s mission.

Mayo’s commitment to education increased to $148.1 million in 2002, with Mayo funds accounting for $110.0 million of this amount.

Total expenditures on research climbed to $323.6 million, up from $296.3 million in the previous year. Outside funding accounted for $192.5, or nearly 60 percent of the research budget. Mayo contributed $131.1 million to research endeavors.

Expanding Mayo’s reach

Mayo’s diversification activities include Mayo’s health information publishing enterprises, clinical laboratory reference services, technology transfer, and other services and products that extend Mayo’s medical and scientific knowledge base. These diversification activities generated a net surplus of $38.1 million to support Mayo programs in medical education and research.

Involving our benefactors

Gifts from individuals, foundations, philanthropic organizations and other sources play an important role in Mayo Clinic’s ability to fulfill its mission.

In 2002, Mayo Foundation received contributions of $121.0 million from almost 56,000 benefactors. This total — the fifth highest in Mayo’s history — came during a year of economic uncertainty. Looking ahead, 444 benefactors have informed Mayo that they would provide about $72.5 million in future gifts.

Philanthropy has had a profound impact on all Mayo programs, supporting research, education and innovations in patient care. During the last 30-plus years, benefactors have contributed more than $1 billion to support the institution.
Minding our investments

The investment climate remains difficult. Even though Mayo’s investment returns were better than national benchmarks, they declined in value by $89.1 million over the course of the year. In addition, $87.2 million from Mayo’s investments was allocated to support Mayo Clinic programs in research and education, resulting in a combined reduction in investments of $176.3 million.

Despite the difficult investment climate in recent years, Mayo anticipates a positive investment position over the long term.

Consolidated revenue for 2002

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mayo Clinic in Rochester</td>
<td>43%</td>
</tr>
<tr>
<td>Mayo Clinic in Scottsdale</td>
<td>9%</td>
</tr>
<tr>
<td>Mayo Clinic in Jacksonville</td>
<td>11%</td>
</tr>
<tr>
<td>Mayo Health System</td>
<td>21%</td>
</tr>
<tr>
<td>Research</td>
<td>4%</td>
</tr>
<tr>
<td>Mayo Collaborative Services</td>
<td>4%</td>
</tr>
<tr>
<td>Contributions</td>
<td>1%</td>
</tr>
<tr>
<td>Investments</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
</tbody>
</table>

Total for 2002 revenues $4,425,100,000
Total for 2001 revenues $4,134,800,000

Expenses for 2002

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries and benefits</td>
<td>60%</td>
</tr>
<tr>
<td>Facilities</td>
<td>9%</td>
</tr>
<tr>
<td>Supplies and services</td>
<td>28%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>

Total $4,363,800,000

Investment performance (By percentage)

<table>
<thead>
<tr>
<th>Source</th>
<th>One-year</th>
<th>Three-year</th>
<th>Five-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>General fund</td>
<td>-7.8</td>
<td>-2.6</td>
<td>4.4</td>
</tr>
<tr>
<td>Benchmark</td>
<td>-13.3</td>
<td>-10.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
## CONSOLIDATED STATEMENT OF ACTIVITIES

**Years ended Dec. 31, 2002 and 2001 (In millions)**

<table>
<thead>
<tr>
<th>Description</th>
<th>2002</th>
<th>2001</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue, gains and other support:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net medical service revenue</td>
<td>3,709.6</td>
<td>3,406.8</td>
<td>302.8</td>
</tr>
<tr>
<td>Grants and contracts</td>
<td>196.0</td>
<td>168.2</td>
<td>27.8</td>
</tr>
<tr>
<td>Investment return allocated to current activities</td>
<td>87.2</td>
<td>101.8</td>
<td>(14.6)</td>
</tr>
<tr>
<td>Contributions available for current activities</td>
<td>55.2</td>
<td>54.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Premium revenue</td>
<td>126.1</td>
<td>166.5</td>
<td>(40.4)</td>
</tr>
<tr>
<td>Other</td>
<td>251.0</td>
<td>237.0</td>
<td>14.0</td>
</tr>
<tr>
<td><strong>Total revenue, gains, and other support</strong></td>
<td>$ 4,425.1</td>
<td>$ 4,134.8</td>
<td>$ 290.3</td>
</tr>
<tr>
<td><strong>Expenses:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salaries and benefits</td>
<td>2,620.7</td>
<td>2,383.5</td>
<td>237.2</td>
</tr>
<tr>
<td>Supplies and services</td>
<td>1,206.0</td>
<td>1,162.0</td>
<td>44.0</td>
</tr>
<tr>
<td>Facilities</td>
<td>395.3</td>
<td>395.2</td>
<td>0.1</td>
</tr>
<tr>
<td>Provision for uncollectible accounts</td>
<td>97.4</td>
<td>93.4</td>
<td>4.0</td>
</tr>
<tr>
<td>Finance and investment</td>
<td>44.4</td>
<td>47.5</td>
<td>(3.1)</td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td>$ 4,363.8</td>
<td>$ 4,081.6</td>
<td>$ 282.2</td>
</tr>
<tr>
<td><strong>Income from current activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$ 61.3</td>
<td>$ 53.2</td>
<td>$ 8.1</td>
</tr>
<tr>
<td><strong>Non-current and other items:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributions not available for current activities, net</td>
<td>45.0</td>
<td>85.4</td>
<td>(40.4)</td>
</tr>
<tr>
<td>Unallocated investment loss, net</td>
<td>(176.3)</td>
<td>(124.8)</td>
<td>(51.5)</td>
</tr>
<tr>
<td>Pension and postretirement benefits, net of service cost</td>
<td>(52.3)</td>
<td>(44.4)</td>
<td>(7.9)</td>
</tr>
<tr>
<td>Other</td>
<td>(5.8)</td>
<td>(29.9)</td>
<td>24.1</td>
</tr>
<tr>
<td><strong>Total non-current and other items</strong></td>
<td>(189.4)</td>
<td>(113.7)</td>
<td>(75.7)</td>
</tr>
<tr>
<td><strong>Decrease in net assets before other changes in net assets</strong></td>
<td>(128.1)</td>
<td>(60.5)</td>
<td>(67.6)</td>
</tr>
<tr>
<td><strong>Minimum pension liability</strong></td>
<td>(84.2)</td>
<td>(7.7)</td>
<td>(76.5)</td>
</tr>
<tr>
<td><strong>Decrease in net assets</strong></td>
<td>(212.3)</td>
<td>(68.2)</td>
<td>(144.1)</td>
</tr>
<tr>
<td><strong>Net assets at beginning of year</strong></td>
<td>$ 2,527.5</td>
<td>$ 2,595.7</td>
<td>$ (68.2)</td>
</tr>
<tr>
<td><strong>Net assets at end of year</strong></td>
<td>$ 2,315.2</td>
<td>$ 2,527.5</td>
<td>$ (212.3)</td>
</tr>
</tbody>
</table>

The above summary is intended to present a brief review of Mayo’s financial condition and activities for 2002 compared with 2001. The financial statements of Mayo Foundation for the year ending Dec. 31, 2002, were examined by Ernst & Young LLP. A copy of its report and Mayo’s financial statement can be obtained by writing to the Treasurer, Mayo Foundation, Rochester, MN 55905.
### CONSOLIDATED STATEMENT OF FINANCIAL POSITION

**Years ended Dec. 31, 2002 and 2001 (In millions)**

<table>
<thead>
<tr>
<th>Assets</th>
<th>2002</th>
<th>2001</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and cash equivalents</td>
<td>21.7</td>
<td>13.8</td>
<td>7.9</td>
</tr>
<tr>
<td>Receivables for medical services – net</td>
<td>737.5</td>
<td>725.1</td>
<td>12.4</td>
</tr>
<tr>
<td>Investments – at market</td>
<td>1,744.3</td>
<td>1,815.8</td>
<td>(71.5)</td>
</tr>
<tr>
<td>Other assets</td>
<td>532.0</td>
<td>530.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Land and facilities – cost less depreciation</td>
<td>2,660.9</td>
<td>2,543.5</td>
<td>117.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 5,696.4</strong></td>
<td><strong>$ 5,628.7</strong></td>
<td><strong>$ 67.7</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liabilities and net assets</th>
<th>2002</th>
<th>2001</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts payable and current liabilities</td>
<td>529.0</td>
<td>492.0</td>
<td>37.0</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>1,446.7</td>
<td>1,423.0</td>
<td>4.4</td>
</tr>
<tr>
<td>Other long-term liabilities</td>
<td>1,405.5</td>
<td>1,166.9</td>
<td>238.6</td>
</tr>
<tr>
<td>Net assets</td>
<td>2,315.2</td>
<td>2,527.5</td>
<td>(212.3)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 5,696.4</strong></td>
<td><strong>$ 5,628.7</strong></td>
<td><strong>$ 67.7</strong></td>
</tr>
</tbody>
</table>

### MAYO SERVICES AND PEOPLE

<table>
<thead>
<tr>
<th>Measures of service</th>
<th>2002</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total clinic patients*</td>
<td>501,019</td>
<td>503,682</td>
</tr>
<tr>
<td>Hospital admissions</td>
<td>124,633</td>
<td>121,967</td>
</tr>
<tr>
<td>Hospital days of patient care</td>
<td>590,928</td>
<td>594,374</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The people of Mayo (average full-time equivalents)**</th>
<th>2002</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff physicians and medical scientists</td>
<td>2,631</td>
<td>2,503</td>
</tr>
<tr>
<td>Clinical and research associates and fellows</td>
<td>514</td>
<td>505</td>
</tr>
<tr>
<td>Resident and students</td>
<td>1,843</td>
<td>1,770</td>
</tr>
<tr>
<td>Administrative and allied health personnel</td>
<td>36,539</td>
<td>35,272</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41,527</strong></td>
<td><strong>40,050</strong></td>
</tr>
</tbody>
</table>

* This line includes Rochester, Jacksonville and Scottsdale only.

** Mayo Foundation employed a total of 46,314 individuals in full-time or part-time positions during 2002.
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Mayo Clinic in Scottsdale

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Chair, Legal Department

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Chair  
Department of Foundation Finance

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